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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,030	11/16/2001	Edward H. Sargent	115354.00104	7743

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EXAMINER	
LEE, JOHN D	

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 04/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/988,030	SARGENT, EDWARD H.	
	Examiner	Art Unit	
	John D. Lee	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 November 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *(4)*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

This Office action is responsive to applicant's communication filed on March 12, 2004, in which applicant elected *with traverse* Invention I, represented by claims 1-4 and 7-19. In response to applicant's traverse of the restriction requirement, the arguments regarding substantial overlap of the search requirements for the two inventions and no additional burden being imposed on the Examiner are persuasive. Accordingly, upon reconsideration, **the previously applied requirement for restriction is withdrawn**. All of the pending claims (i.e. claims 1-23) are examined herein.

The four (4) sheets of drawing filed with this application on November 16, 2001, are objected to by the Examiner because the handdrawn legends, figures, and lines are, in many places, faint and indistinct. New formal drawings in compliance with 37 C.F.R. § 1.84 are required in response to this Office action. The requirement will not be held in abeyance.

The disclosure is objected to because of the following informalities: on page 2 (line 1) of the disclosure, the Serial Number of the U.S. Application mentioned therein must be provided. Appropriate correction is required. Applicant's cooperation is requested in correcting any other errors of which applicant may become aware in the specification.

Claim 7 is objected to because of the following informalities: the next-to-last line of this claim should begin with the identifier "(c)". Appropriate correction is required.

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no antecedent support for the term "the plurality of wavelengths" used in this claim, and it is thus impossible to discern the intended claim meaning. The indefiniteness of claim 11 therefore precludes further examination of same with respect to prior art.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 7-9, 12, 16, 17, and 19 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by U.S. Patent 5,084,894 to Yamamoto. Yamamoto discloses semiconductor optical amplifying elements having InGaAsP-based quantum well structures (single quantum wells or multiple quantum wells), the quantum well structure having a quantum well active region whose optical gain spectrum is electrically controlled (bandgap properties being modified) by control of the current applied to the quantum well. See, for example, the paragraph bridging columns 4 and 5 of

Yamamoto. See also column 19, lines 36-41, of Yamamoto. Notice that compositional changes are also envisioned to help in gain spectrum control (column 4, lines 60-67, of Yamamoto).

Claims 10 and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,084,894 to Yamamoto. Yamamoto does not disclose spatial thickness variation of the quantum well active region as a means for modifying the bandgap properties thereof, but this is a known technique in the art (see U.S. Patent Application Publication 2002/0195597 A1 to Choa, cited herein). The use of this technique in Yamamoto would thus have been obvious to a person of ordinary skill. Yamamoto also does not specifically disclose the "determination of adequacy" step set forth in claim 18 herein. Since current control of the optical gain spectrum of each of the quantum well active regions in Yamamoto can be used for many different reasons, however, the selection of this type of reason for such control would have been obvious.

Claims 13-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,084,894 to Yamamoto in view of U.S. Patent 6,611,007 to Thompson et al. Yamamoto does not disclose rapid thermal annealing for controlled diffusion effects into the quantum well active region (including the provision of layers having the same defects as set forth in claims 14 and 15). Such rapid thermal annealing is very well known, however, as evidenced by the Thompson et al reference. Since both Yamamoto and Thompson et al relate to the same type of bandgap-modifying semiconductor quantum well structures, the use of the rapid thermal annealing

technique (as taught by Thompson et al) in Yamamoto would have been obvious to the person of ordinary skill in the art.

Claims 5, 6, and 20-23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,005,708 to Leclerc et al in view of U.S. Patent 5,084,894 to Yamamoto. Leclerc et al discloses various embodiments of Mach-Zehnder interferometer optical wavelength converters that operate in essentially the same manner as those being claimed herein. The semiconductor optical amplifiers thereof, however, do not have all the same distinctions and limitations as the amplifiers of applicant's claimed wavelength converters. As indicated by the preceding discussion, though, Yamamoto discloses that these amplifiers are well known in the art. Since a controllable semiconductor optical amplifier would clearly be desirable for use in the Leclerc et al wavelength converters, the use of the Yamamoto semiconductor optical amplifier in the Leclerc et al wavelength converters would have been obvious to a person of ordinary skill.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 5,959,764 to Edagawa et al shows, in Figure 12, a Mach-Zehnder interferometer type wavelength converter utilizing semiconductor optical amplifiers in a manner similar to that being claimed herein. U.S. Patent Application Publication 2002/0003650 A1 to Usami et al describes a semiconductor optical amplifier whose gain spectrum can be modified by an optical control beam. U.S. Patent Application Publication 2002/0195597 A1 to Choa describes a semiconductor optical amplifier with a quantum well structure having a continuously changing bandgap. U.S.

Patent 6,563,627 to Yoo shows various interferometer type wavelength converters utilizing semiconductor optical amplifiers. U.S. Patent 6,697,414 to Kato et al teaches that InGaAsP semiconductor quantum well structures can have bandgap widths modified by means of compositional changes.

All of the prior art documents submitted by applicant in the Information Disclosure Statements filed on April 12, 2002, January 30, 2003, March 5, 2003, and November 4, 2003, have been considered and made of record. Note the attached initialed copy of forms PTO-1449. None of these documents are as pertinent as the prior art documents relied on in the rejections above.

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.

John D. Lee
Primary Patent Examiner
Group Art Unit 2874